

## Summary of proposed changes to PhD checkpoints and progress monitoring.

### 1. Drop the current MSc paper presentation requirement in our PhD program

Although every PhD student should be encouraged to give research talks, this is not something the Grad Office needs to formally sign off on. Moreover, requiring each student to speak on their prior MSc work is not always in the best interests of the student.

### 2. Enforce a 16 month deadline for the Qualifying Oral, and lighten the preparation requirements for this exam.

Currently the median time to the PhD Qual. Oral is more than 2.5 years. We need to place the emphasis on providing timely feedback to students and de-emphasize the current content requirements for the "depth paper".

### 3. Enforce annual PhD committee meetings (aka Yearly Progress Reviews) after the Qualifying Oral.

This replaces the both the Research Proposal and Thesis Proposal checkpoints. Instead a student can seek approval of their thesis topic or of their thesis proposal at a Yearly Progress Review. Again, the emphasis is on holding regular meetings of the PhD supervisory committee rather than waiting for the student to produce a specific document before scheduling a meeting.

### 4. In order to achieve candidacy a PhD student needs to have completed their course work and have an approved thesis topic.

This what "achieves candidacy" means according to SGS .

### 5. Annual progress monitoring reports are to be provided to the PhD supervisory committee at least a week before the meeting, and will be reviewed during the committee meeting.

The current system of progress monitoring is to be discontinued. Given the enforcement by the Graduate Office of annual committee meetings, the PhD supervisory committees are to take the primary responsibility for progress monitoring.

### 6. Changes to the PhD-direct program:

- a. Delete the current requirement of writing an (MSc) research paper. Instead, the Qualifying Oral must be held within 16 months.
- b. Students will enter the same checkpoint system and timing as other PhD students (with the exception that they have four years instead of three to achieve candidacy).
- c. PhD-direct (and PhD students w/o a previous MSc in Computer Science) will be permitted to drop-down to the MSc program and, after meeting the regular MSc program requirements, graduate with an MSc.

For more information on the current rules, see the [2014-15 Graduate Handbook](#).

**Proposal for PhD supervisory committee meeting requirements.****Preamble on PhD Training**

The main goal of a successful PhD is not so much a thesis, but rather (and much more importantly) it is to train a researcher and prepare them for further professional development. One aspect of this training is to ensure that the individual has a broad and deep knowledge of Computer Science. The starting point for this aspect is the completion of our course and breadth requirements. However course work is, by design, limited to relatively narrow and well-defined assignments, projects and exams. To be a successful PhD student, the candidate needs a much broader set of skills, including the maturity as a researcher to cope with significantly more uncertainty than is typically seen in course work. Additional skills include the abilities to evaluate the current literature, to select promising directions for future work, and to follow some of those directions through to the nuggets of new contributions. In our experience with our own students we typically see these skills develop slowly, continuing through to their graduation from our PhD program. However, our expectation is that the foundations for these skills should already be in place and evident by the beginning of the second year of PhD studies.

Specific skills that we expect to be developed by a PhD candidate include:

- a) The ability to **apply the basic tools of the field** in potentially new ways, along with the self-understanding of what they themselves know and what they have yet to learn.
- b) The ability to **select significant research contributions** from a larger set of published papers, and justify that selection (for example, on the basis of significance of the results or the novelty of the approach).
- c) The ability to **relate the papers to one another**, and to other research in the literature.
- d) The ability to **critique the research methods** used in these papers, including the strengths and weaknesses of these methods and likely threats to validity, whether these are acknowledged in the papers or not.
- e) The ability to **identify limitations of the results** (and possibly errors) reported in the papers, along with their implications.
- f) The ability to **suggest alternative approaches** to answering the research questions posed in these papers.
- g) The ability to **identify and prioritize lines of investigation for further research**, based on an understanding of significant limitations of the research described in the papers and/or important open problems that the papers fail to answer, and also on the likelihood of being able to make progress on such issues.

**PhD Committee Meetings**

In order to provide timely feedback to the student it is required that each PhD student meets regularly with their PhD supervisory committee in one of the following four types of meetings:

- 1. Qualifying Oral (held before 16 months of PhD study has been completed).
- 2. Yearly Progress Review (held at least annually after the qualifying oral).
- 3. Departmental Thesis Defense.
- 4. Final Oral Exam at SGS.

Additional details about these types of checkpoints are provided further below.

Before the Qualifying Oral and each Yearly Progress Review the student and supervisor will complete a Progress Monitoring Report. This PM report will be sent to the supervisory committee members at least a week prior to the scheduled exam (along with any other documents that are required at the committee meeting).

**1. Qualifying Oral** (before 16 months): Working with their supervisor, the student should have selected 5-10 research papers to be emphasized at their qualifying oral. These should be important papers in one research area of relevance to CS. This research area need not correspond to the student's eventual choice of PhD topic, and hence the student does not have to have picked a thesis topic prior to this committee meeting. In relation to the selected papers, the student will be examined on the points (a) through (e) listed in the preamble. It is expected that students will have read and understood more than just the selected papers, but it is not expected that the student master the majority of the relevant literature at the time of this exam.

In order to help focus the initial questioning, the student will prepare a short position paper (less than 10 pages, double spaced, in a reasonable font) on points (c-e) above. If the student has begun to investigate this area themselves, then s/he is welcome to briefly describe his/her progress so far. In addition, it is the student's option to discuss the expected overall scope of the questioning with his/her supervisory committee several weeks prior to the exam.

At the beginning of the Qualifying Oral, the student will be asked to give a 15 minute talk to introduce her/his position on the research described in the selected papers. This will be followed by one or more rounds of questioning by the supervisory committee. During this questioning it is critical that the student demonstrates an understanding of CS tools and techniques that are relevant to pursuing research in the area.

The supervisory committee will provide written feedback to the student (through the DCS Graduate Office), and the student will be invited by the Graduate Office to respond to this feedback. In addition, one of the following examination results will be provided:

- Pass.
- Conditional Pass. The student is given one or more concrete tasks to complete before the next committee meeting or perhaps before an earlier deadline.
- Fail (with the option to repeat). The student is placed in a probationary period, and must retake the exam within 6 months. The student will not be given a third chance to pass the exam.
- Fail (no option to repeat). Student must either withdraw from the program or have their registration terminated.

## **2. Yearly Progress Review (at least every 12 months after the Qualifying Oral)**

Yearly progress reviews are for students who have passed their qualifying oral, and are not yet ready for their Departmental Thesis Defense.

**Deadline:** Yearly progress reviews must be held at most 12 months after the student's previous PhD supervisory committee meeting (including the Qualifying Oral). If the student is expecting

to schedule their Departmental Thesis Defense shortly after this deadline has passed, then they can request an extension of up to 6 months.

**Purpose:** To assess the student's research progress since the previous committee meeting and to provide feedback on the student's research plans for the coming year.

**Student Preparation:** The student must complete a progress monitoring report and submit this to the Graduate Office. The student may also submit their own papers, or drafts that they are working on. If they wish to be considered for candidacy or have their thesis proposal approved then they should provide the relevant documents (see below) to their committee at least two weeks prior to the meeting.

### **Preparation for Specific Checkpoints at the Yearly Progress Review:**

#### **a) Thesis Topic**

SGS requires that PhD students **achieve candidacy** within the first 36 months of their program (48 months for PhD-direct students). Achieving candidacy involves completing all course work and having a thesis topic approved by their PhD supervisory committee.

To obtain the committee's approval the student needs to submit a written description of their thesis topic to their committee, at least two weeks in advance of their yearly progress review meeting. This document needs to describe the scope of the proposed research, explain its context with respect to the current literature (see items e-g in the preamble above), and provide an initial research plan. The thesis topic needs to be sufficiently broad to form the basis for a thesis, and it should be plausible that the student be able to complete a thesis on this topic within two to three years. A student may still decide to switch thesis topics after achieving candidacy. This won't affect their candidacy. However the student will need to clearly describe their new thesis topic to their committee members during their next annual review.

**Expected timing:** In order to meet the SGS requirements, PhD students should plan to seek approval for their thesis topic before 28 months, that is, at their first yearly progress review. PhD-direct students should seek approval for their thesis topic before 40 months (i.e., at their second yearly progress review).

#### **b) Thesis Proposal (expected at second Yearly Progress Review, before 40 months)**

The primary purpose of a thesis proposal is for the student to seek approval from the committee for the overall scope of the eventual thesis. The student submits a written proposal to the supervisory committee outlining both the completed and anticipated the results of the thesis. A substantial portion of research should have been successfully completed, and a clear plan for completing the remainder should be included in the document. Ideally, a thesis proposal is a draft of a substantial portion of the thesis itself, along with a clear description the remaining work to be completed. The supervisory committee assesses the scope and relevance of the problems the student has solved, and ensures significant content to the proposed thesis.

**Expected timing:** The thesis proposal is typically completed six months to a year prior to the departmental thesis defense. The expectation is that, for PhD students, the thesis proposal will

be completed by the student's second yearly progress review (i.e., within 40 months of the start of their program). While PhD-direct students are expected to complete this at their third yearly progress review (i.e., within 48 months).

**Committee Recommendations:** After a yearly progress review the supervisory committee will provide written feedback to the student (through the DCS Graduate Office), and the student will be invited by the Grad Office to respond to this feedback. In addition, the following examination results will be provided:

- Pass and any of:
  - o the proposed thesis topic is approved and, given the completion of the course and breadth requirements, the student to be considered to have achieved candidacy.
  - o the detailed thesis proposal has been approved.
- Conditional pass. The student must provide additional material to the committee before a specific deadline (no more than 12 months in the future).
- Fail (first time). Student placed in a probationary period, and must reschedule the committee meeting within the next 6 months.
- Fail (while on probation). Student must either withdraw from the program or have their registration terminated.

### **3. Departmental Thesis Examination**

The student defends the thesis before the supervisory committee. Outside members are also invited. A draft of the thesis should be available to the committee members well in advance of the departmental thesis examination date (3-4 weeks is recommended). Each member of the committee is expected to read the thesis in sufficient detail to form a judgment about its acceptability. The committee may approve the thesis without reservations, approve the thesis on condition that minor modifications be made, or require the student to take another departmental thesis examination.

### **4. Final Oral Examination (FOE) at the School of Graduate Studies**

Upon the successful defense of the thesis at the Departmental Thesis Examination, the candidate will be ready to go forward to the Final Oral Examination. Eight weeks prior to the proposed date of the examination the student should notify the Graduate Office of the intention to book a Ph.D. Final Oral Examination at the School of Graduate Studies. All forms and instructions are available on the DCS internal web page or from the Graduate Office. Full FOE details and regulations can be found on the SGS website.

It is important to allow yourself and the Graduate Office plenty of time to organize the necessary steps and follow the required procedures in setting up your Ph.D. Final Oral Examination. The School of Graduate studies is under no obligation to find an FOE chair if a minimum of six weeks' notice is not provided.

### **Graduation:**

A graduation package will be sent to the student from the Convocation Office regarding convocation dates, tickets, etc. approved prior to scheduling their Departmental Defense. The Departmental Defense must be completed before the SGS Final Oral Exam can be scheduled.

### **5. Dropping down to the MSc program**

Students in the PhD-direct program may choose to drop down to the MSc program, in which case they are required to complete the standard MSc program requirements (namely, the MSc course breadth requirements along with the MSc research paper). Similarly, students in the PhD program who do not have a previous MSc degree in Computer Science can drop down to our MSc program. In either case, the student's guaranteed funding period will be reduced to 17 months, the limit for the MSc program. If the student has been funded for more than 17 months, their funding will be terminated.

### **6. Appeals**

Graduate students may appeal the decisions made in by their PhD supervisory committee. The procedures for such an appeal are described in the SGS Calendar (see the Academic Appeals Process, p. 60 in the 2013-14 calendar).

### **7. Opting into the New Checkpoint System**

PhD students who enrolled in their program before January 1, 2015 and are maintaining regular meetings with their supervisory committees will be able to continue with the previous PhD checkpoint system. Alternatively, they can opt into the new system. However, if a student under the previous checkpoint system fails to have a committee meeting for 18 months or more, then they will be placed under the new system.